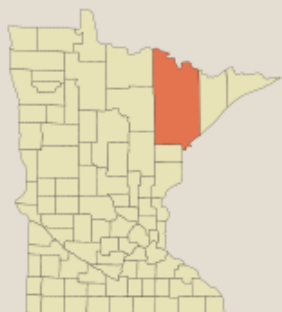


St. Louis County, Minnesota

Comprehensive Water Management Plan

Update 2010 – 2020

Amended June 24, 2015



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Executive Summary

The intent of this plan is to provide strategies to address the water related issues in St. Louis County. Issues were identified during a systematic, region-wide scoping process between August 2008 and March 2009. During that time, citizens, local government officials and agency representatives were invited to provide input about which water quality concerns are most critical for the county to address.

From late 2009 to early 2010, staff members from the St. Louis County Planning and Community Development Department, both North St. Louis and South St. Louis Soil & Water Conservation Districts, the Water Plan Advisory Task Force, and Technical Advisory Committee worked to formulate strategies, develop a timetable and estimate the cost to adequately address the identified priority concerns. They also completed the Comprehensive Water Management Plan Document and expanded outreach to cities and townships on the county website. The public was then given the opportunity to comment on the plan at a public hearing held on March 25, 2010. The plan was approved by BWSR on August 26, 2010, and by the county Board of Commissioners on September 14, 2010.

The plan was amended in 2015 as required by BWSR for the five year review. The Water Plan Advisory Committee reconvened on December 22, 2014, to review and update the priority concerns, goals, objectives and implementation plan. In order to solicit comments, the county posted the amended plan on their web site 30 days prior to the public hearing. Notification by mail was also sent to the cities, townships, adjacent counties and interested parties. The public was given the opportunity to comment on the amended plan at a public hearing held May 14, 2015. The amended plan was approved by BWSR on June 24, 2015

Introduction to St. Louis County

St. Louis County is located in Northeastern Minnesota and is the largest county east of the Mississippi River. It is an estimated 7,092 square miles in size, and has over one thousand lakes. St. Louis County is known for its spectacular natural beauty, including a national forest (Superior National Forest), a national park (Voyageurs National Park), the Boundary Waters Canoe Area Wilderness, four state parks, and many popular recreational trails, including portions of the Superior Hiking Trail.

Eight major watersheds are contained within, or straddle parts of, the county: the Lake Superior, Cloquet River, and St. Louis River watersheds drain to the southeast (Lake Superior), a small portion of the Mississippi River-Grand Rapids watershed drains to the Mississippi to the west, the Little Fork River watershed drains northwest to Rainy River, the Rainy River-Rainy Lake and Rainy River-Headwaters drain north to Rainy Lake and Rainy River and the Vermilion River watershed drains north to Crane Lake. The watersheds that are located generally in the northern part of the county are part of the Rainy River Basin. Those generally in the south are part of the Lake Superior Basin. See the attached “Major Watersheds” map (**Figure 3**) for more information.

St. Louis County has 26 cities and 73 organized townships. It also has 72 un-incorporated communities, 26 unorganized territories and 1 “Census Designated Place.” There are about 32 persons per square mile. The city of Duluth serves as the county seat with a population of approximately 86,000. The estimated 2008 population of St. Louis County was 196,864 (U.S. Census). This represents an estimated 1.8% decline in population in the county between the years 2000 and 2008. The Minnesota State Demographic Center predicts that the county’s population will rise to 202,040, an increase of about 2.6%, by 2030.

The Iron Range cities, Hibbing and Virginia, and the Lake Superior port city, Duluth, are the county’s population and economic centers. Both population centers have international importance; Duluth for its freshwater port, which is one of the largest in the world, and the Iron Range for its large mining industry. Surrounding counties are: Carlton County to the south; Aitkin, Itasca and Koochiching Counties to the west; Lake County to the east; and Douglas County, Wisconsin, to the southeast (across the St. Louis River). The coast of Lake Superior creates part of the county’s southern border, while the Rainy River District of Ontario, Canada, flanks its northern border. Taconite mining makes up a large sector of the region’s economy, along with health care, timber, transportation, technology and tourism. Most of the United States’ Iron Ore reserves are located on St. Louis County’s Mesabi Iron Range, which has enough ore reserves to keep iron mining in production for more than 200 years.

St. Louis County is comprised of an estimated 4,311,013 acres. Of that, approximately 22.6% is bog/marsh/fen and 8.7% is surface water. Less than 0.1% of the land is cultivated and only 0.7% is urban/industrial. Half of the county is collectively classified as “Forest,” which is a factor in the county’s high water quality. Because of its large geographic area, St. Louis County leads the state in number of acres of forested area, bog/marsh/fen, brushland, and surface water. Of the total acres, 37% is privately owned and 56% is publicly owned. See **Figure 7** for the balance of land ownership by type.

Minnesota’s groundwater supply can be divided into three types of hydrogeologic sources: glacial drift sources, glacial outwash sources and bedrock sources. St. Louis County overlays two types of groundwater sources: glacial outwash and glacial drift. Groundwater sources in glacial drift areas may be unreliable as they do not recharge quickly. They are typically surrounded by clayey

glacial till that is several hundred feet thick. Residents living in these areas often supplement their drinking water supply with surface water sources (streams, inactive mine pits and Lake Superior). Groundwater sources in glacial outwash areas yield more plentiful groundwater, as they are more sand-based and located nearer to the surface. (*DNR Waters, Minnesota's Water Supply: Natural Conditions and Human Impacts, 2000*).

Plan History and Purpose

The purpose of this plan is to provide the citizens and elected officials of St. Louis County with a strategic framework to manage water resources. In 1985, the State of Minnesota adopted the Comprehensive Local Water Management Act under State Statutes 103B.301 – 103B.335. The act encourages counties outside of the metropolitan area to develop and implement comprehensive water management plans. Local ownership and implementation of the plan is the hallmark of the program. While development of a plan is voluntary, various state grants and some federal funding sources require that a county have an adopted local water management plan that is periodically updated. The St. Louis County Comprehensive Water Management Plan (CWMP) is a comprehensive analysis of water and related land resources coupled with a recommended series of strategies designed to achieve the county's water management goals. The plan acknowledges the county's large size and its three continental basins and eight major watersheds.

The St. Louis County Water Management Plan was originally adopted in 1992. In 1999, amendments were made related to wetland program administration, and in 2001, a revised plan was adopted.

In May of 2008, Minnesota's Board of Water and Soil Resources granted the county an extension of the plan until May of 2010, at which time this updated plan will take effect. This plan will be valid through August 26, 2020, with an amendment scheduled for 2015. The St. Louis County Board adopted a resolution on March 11, 2008, requiring the update and revision of the St. Louis County Water Management Plan. Counties are responsible for water management, and approximately one-third of Minnesota counties, including St. Louis County, delegate this program to county Soil and Water Conservation Districts (SWCDs). Due to its size, St. Louis County is one of only two in Minnesota to have two SWCDs – one serving the northern part of the county, based in Virginia, and one serving the southern part of the county, based in Duluth. The Advisory Committee reconvened on December 22, 2014, to review and update the priority concerns, goals, objectives and implementation plan as part of the required plan amendment process.

The purpose of water planning is to protect water resources through the adoption and implementation of local water management plans that are based on local priorities. To this end, the water management planning process for this plan sought to: 1) identify existing and potential problems facing the county's water resources; 2) identify opportunities to protect those water resources; 3) identify goals and objectives to manage the county waters and their related land uses in ways that promote sound, hydrologic and efficient management and effective environmental protection of those water resources; and 4) devise and carry out a plan of action that achieves the stated goals and objectives related to managing the county's water resources.

Most of the issues addressed in this plan apply county-wide. However, within certain sections, there may be references to specific watersheds or sub-watersheds.

Past Accomplishments 1990 - 2010

This revised plan builds upon the activities and objectives of earlier plans. The county has been implementing the actions in the current plan over the past 15 years. Many of the issues from the first plan(s) will continue to be addressed in the updated plan, though their importance may be eclipsed by issues that have grown in priority or due to changing environmental policies and conditions.

The county's past water planning efforts have led to many accomplishments to date including:

- Increased public awareness and support by the Planning Commission and Board of Adjustment regarding the importance of protecting and enhancing the shore impact zone when considering development proposals.
- Informational brochures on topics related to shoreland development and other issues were developed and are now available to the public on the county's website and at its offices.
- Municipal sewer lines have been extended into areas that had previously been identified as "problem areas," including Pike Lake and along the North Shore. "Problem areas" are those areas with poor (e.g. clay) soils, high water tables, and areas that are densely developed with small lots.
- The availability of Geographic Information Systems (GIS) has increased significantly, including progress in the completion of a county-wide parcel layer and GIS maps that are available to the public via the county's website.
- Stormwater issues are more frequently addressed during development reviews. Decision-makers have come to understand that protecting and improving lake water quality involves more than addressing failed septic systems. A water plan challenge grant based on stormwater-related goals in the water plan led to the development of specific solutions for stormwater management for three lakeshore lots on lakes with varying development densities.
- Cooperation between St. Louis County and Itasca County to develop information on small lakes with the help of a water plan challenge grant.
- The water plan supported the county wetland plan, and over the past several years, the county's wetland administration program has become one of the best in the state.
- The Lake Superior and Rainy Basin plans were developed using data and goals from the water plan.
- Coordination between land use permitting and on-site sewage treatment decisions have been improved. For example, a three-bedroom home is now the standard used to determine whether or not a lot has sufficient room to accommodate an on-site sewage treatment system.
- The development of a county-level river classification system that is more extensive than the state's classification system, as recommended in the water plan.
- An expanded lake water quality monitoring program in cooperation with the North St. Louis Soil and Water Conservation District. This led to the establishment of specific quality standards for several lakes. The Aerie Lake sewer system was developed, in part, because of the identification of poor water quality through these monitoring efforts.
- Development of a program for financial assistance to homeowners for on-site sewage treatment systems.
- Establishment of new county shoreland regulations that meet the requirements of the state while still addressing unique county issues.
- Implementation of a plan for enforcing certain county controls such as zoning.

- Improved regulation of county borrow pits, with increased focus on environmental concerns in the permitting process.
- Improved and expanded efforts to inform the public about county regulations.

Earlier versions of the county water plan set ambitious goals. Changing priorities, funding availability, requirements of other agencies and emerging environmental issues often result in some goals not being achieved during the plan's timetable. Water plan goals that have not been extensively addressed to date include:

- Groundwater studies for Duluth and the Iron Range – These studies would require substantial non-county financial resources, which have yet to be identified. In addition, little improvement has been made in the groundwater data that is available to the public and the county. This issue may be addressed as part of the groundwater and surface water protection priority concern.
- Environmental audits of county agencies involved in county environmental issues. A formal audit has not yet been conducted, however, some changes have been made in how programs are run. This issue will not be addressed in the updated plan.
- Development and implementation of a wellhead protection plan and well-sealing information should be incorporated in land use decision making and future plans. This issue is proposed to be addressed in the updated plan.

Current Accomplishments 2010-2014

- St. Louis County adopted Subdivision Ordinance 60 which requires conservation subdivision plat on Natural Environment Lakes. Protect natural areas, reduce impervious surfaces, and minimize stormwater.
- St. Louis County adopted Subsurface Sewage Treatment System Ordinance (SSTS) 61 February 26, 2014.
- St. Louis County Environmental Services Department established a loan program using approximately \$450,000 of state, federal, and county housing and redevelopment authority funds to assist 26 low- to moderate-income properties correct failing septic systems.
- Well Head protection plans being implemented in City of Cook, Orr, Winton, Iron Junction, Buhl, Meadowlands, and Tower.
- Minnesota Pollution Control Agency (MPCA) Major Watershed contracts/work: Assisted MPCA with civic engagement and data collection for surface waters in the St. Louis River and Lake Superior South Major Watersheds (2012-2017).
- Under contract with the MPCA, helped kick off the Watershed Restoration and Protection Strategies (WRAPS) process in the Cloquet River Major Watershed. Specific activities included focused community conversations/civic engagement events regarding PCA's new WRAPS process/Watershed Approach and results of the Monitoring and Assessment reports for St. Louis River (SLR) and Lake Superior South (LSS). Collection of Dissolved Oxygen data and other water quality data. Collection of geomorphic data/Rosgen assessments (2015).
- Natural Resource Research Institute (NRRI) created the "Field Guide for Maintaining Rural Roadside Ditches" manual for townships/small Local Government Units (LGU) who use ditches for stormwater management. This manual provides information on how to maintain ditches so that water quality is protected. Funded under a Great Lakes Restoration Initiative (GLRI) grant (2014) .

- South St. Louis SWCD continued being a member and technical advisor for the Regional Stormwater Protection Team (focused on educating the public about how to mitigate impacts from stormwater).
- South St. Louis SWCD started “enews” quarterly electronic newsletter providing updates on their work.
- South St. Louis SWCD started a facebook page with regular updates on environmental events and on their work.

Miller Creek (temperature/chloride):

- Miller Creek: Completed the Miller Creek Total Maximum Daily Load (TMDL) for Temperature and the TMDL Implementation Plan for the MPCA (2012-2014).
- Completed a Clean Water Fund (CWF) – funded Phase 1 restoration project at mile 5.7 to help address the temperature impairment and improve trout habitat (2015).
- Completed design for and sought funding for Miller Creek Phase 2 restoration project (longer, adjacent downstream section). Same purposes/goals – temperature mitigation (impairment-related) and trout habitat (designated trout stream) (2014-2015).
- Cost shared one well-sealing project (2014).
- Coordinated CWF grant to develop stormwater management plan for the Miller Hill Mall. Barr Engineering is developing the plan. South St. Louis SWCD staff did temperature monitoring at the mall to determine if existing Best Management Practices (BMPs) are providing any temperature mitigation (2015).
- Providing CWFs and assistance to Lake Superior College to implement a stormwater Best Management Practice on their campus (2015).

Knife River (turbidity):

- Under a CWF grant, restored an unstable bank for private landowners using natural channel design. This project survived the 2012 flood and has been used as a case study for the successful use of natural channel design (2010-2012).
- Worked with private riparian landowners to plant trees in Knife River riparian areas on private lands under same CWF grant (2010-2012).
- Completed the Knife River TMDL Implementation Plan (2011).

Amity Creek (turbidity):

- Under a GLRI grant, restored 700 feet of Amity Creek using natural channel design. This reach was along a large eroding bank that was contributing high amounts of sediment to the stream (description/photos on our website) (2014).

Priority Concerns Summary

The St. Louis County Water Plan Task Force selected four priority concerns to address: (1) negative impacts of development, (2) pollution resulting from inadequate wastewater management, (3) pollution to surface and ground waters from contaminated runoff, and (4) impaired waters within eight major watersheds (Table 1). This effort resulted in a Priority Concerns Scoping Document that was approved by the Board of Water and Soil Resources (BWSR) on October 28, 2009.

Priority Concern #1: Development

Development near lakes, rivers and streams increased during the last decade. Land use permit data shows a clustering of development near lakes, especially on large, popular lakes or those relatively close to population centers. Inappropriate or poorly-planned development causes multiple

problems that can harm water quality, including loss of riparian area (buffers), erosion that leads to sedimentation, and pollution from leaky or non-conforming septic systems which will further alter the landscape and cause increased impacts to these sensitive areas. Development on natural environment and shallow lakes is increasing as the shoreland along larger lakes is built up or becomes more expensive. These lakes are less able to withstand impacts and quickly degrade without protective measures.

Goal 1: Mitigate impacts of development – Emphasis: sensitive areas, including lakeshore, wetlands and riparian areas along streams and rivers.

Goal 2: Develop policies and guidelines that address existing and future development.

Estimated cost to implement Priority Concern #1: \$650,000

Priority Concern #2: Wastewater Management

Subsurface Sewage Treatment Systems (SSTS) that do not function correctly impact both ground and surface water quality. In shoreland areas, soil and water conditions may cause systems to be less efficient in treating wastewater. Inadequate treatment can also allow excess nutrients to reach nearby surface waters, resulting in excess algae growth, which can negatively impact recreation and water quality and threaten the survival of fish and other aquatic animals. Urban areas must also deal with wastewater management in regards to sanitary overflows, aging infrastructure, limited capacity and failing systems.

Goal 1: Address water quality problems stemming from inadequate wastewater management.

Estimated cost to implement Priority Concern #2: \$2,700,000

Priority Concern #3 Ground and Surface Waters

Surface water is one of St. Louis County's greatest assets. It has been estimated that over 30% of the land surface is covered by wetlands, lakes and rivers. In addition, approximately 90 percent of the population of St. Louis County drinking water comes from groundwater. Because nonpoint sources of pollution are the largest threat to water quality, a key objective is to control contaminated runoff associated with existing and future landuse development. Special concerns such as controlling invasive species, impacts to wild rice areas, and effects of mining are also important in protecting the rich water resources in St. Louis County.

Goal 1: Protect ground and surface water from the combined impacts of point and non-point source pollutants.

Goal 2: Monitor, assess and restore watersheds.

Goal 3: Coordinate and perform education activities.

Estimated cost to implement Priority Concern #3: \$6,260,000

Priority Concern #4 Impaired Waters

There are 11 impaired streams and 165 impaired lakes partially or wholly located in St. Louis County according to the state's 303(d) list for 2008. These are just the waterways that have been assessed. Since only about 50% percent of the state's waters have been formally assessed for water quality, many more waterways in the county may likely be impaired by pollutants. The county is in support of the TMDL process which is part of the MPCA's Watershed Restoration and Protection Strategy (WRAPS) for the 81 watersheds in Minnesota. Action items under this priority will be located within the eight major Hydrologic Unit Codes (HUC) described in Table 1.

Goal 1: Work towards restoring those waters in the county listed as impaired on state 303(d) list in the Lake Superior South, St. Louis River, Cloquet River, Little Fork River, Vermilion River and Rainy River Rainy Lake (RRRL) and Rainy River Headwaters (RRHW) Watersheds. Estimated cost to implement Priority Concern #4 is project dependent.

Relevant Separate Plans and Controls

The following is a depiction of the plans and controls that are consistent with the work plan efforts outlined in the St. Louis County Comprehensive Water Management Plan:

City of Duluth Ordinance Chapter 18 Erosion and Sediment Control, Chapter 43 Sewers and Sewage Control, Chapter 18, which establishes controls for erosion and sedimentation within the city. Chapter 43, establishes the operation of the cities' wastewater facilities for public health, safety and welfare.

St. Louis County Ordinance #27: Comprehensive Land Use Plan which includes comprehensive and land use plans for county-administered, non-municipal areas. It also includes the North Shore Management Plan, the Vermilion River Plan, the Voyageur Planning Area, and the St. Louis, Cloquet and Whiteface Corridor Management Plan.

St. Louis County Subsurface Sewage Treatment Ordinance 61 provides minimum standards for and regulations of individual sewage treatment systems in unsewered areas of the county.

St. Louis County Subdivision Ordinance 60 ensures proper subdivision and transfers of land for the purpose of development while protecting public health, safety and the natural environment of the county.

Lake Superior Basin Plan: The Lake Superior Basin Plan specifically lists impaired waters and the protection of surface waters as program priorities. The other priority concerns identified in this plan are consistent with the goals and strategies of the Lake Superior Basin Plan.

Rainy River Basin Plan: The Rainy River Basin Plan extols the value of local water management in basin planning. It also emphasizes the need to set priorities and notes that focusing on impaired waters inherently prioritizes local water management planning efforts. The overall goal of the plan is to maintain or improve the condition of streams, rivers, lakes and groundwater in the Rainy River Basin, with sub- goals related to erosion, drinking water and shoreland use. All of these goals are consistent with the goals and actions set forth in this plan.

St. Louis River Remedial Action Plan: There are five priority action items for the St. Louis River Area of Concern. Reducing non-point source pollution, specifically, urban stormwater and restoring and protecting habitat, are two actions that directly support this plan. The remaining priority actions do not conflict with this plan.

Well Head Protection Plans for the following areas: Buhl, Winton, Cook, Iron Junction, Orr, Tower, Forbes Mobile Home Park, Keetac, Meadowlands

Watershed Restoration and Protection Strategy (WRAPS)

- Lake Superior Monitoring and Assessment Report

- St. Louis River Monitoring and Assessment Report

Statewide Conservation and Preservation Plan, 2008: More than 125 experts contributed to this plan, the purpose of which is to: “...identify the state’s natural resources, identify key issues affecting those resources, and make recommendations for improving and protecting them.” The plan cites seven key issues that, if addressed, would “benefit the greatest number of natural resources to the greatest degree.” Land and water habitat fragmentation, degradation, loss and conversion and land use practices were two key issues listed that match the priority concerns set forth in this plan. The other five key issues do not conflict with the priority concerns proposed in this plan. Land and water restoration and protection is one of five strategic areas around which the recommendations in the plan are based.

Minnesota Watermarks: This legislatively mandated document was put together by Minnesota Planning and the Minnesota Environmental Quality Board. It identifies a series of goals and objectives for water resources on a state-wide level. Protecting and restoring surface and groundwater quality are specific goals in this document. The other priority concerns listed in this plan are consistent with the proposed strategies of *Minnesota Watermarks*.

Minnesota Nonpoint Source (NPS) Water Pollution Management Program Plan: This is a statewide plan focused on the greatest threat to our nation’s waters today: NPS. NPS include stormwater and SSTs, which are also cited as priority concerns in this document.

Superior National Forest Plan: This plan guides all natural resource management activities for the Superior National Forest. It describes desired resource conditions, resource management practices, levels of resource production and management, and the availability of suitable land for resource management.

St. Louis, Cloquet, Whiteface Corridor Plan: Section 21 of St. Louis County Ordinance 27: This is a local management plan that provides protection to the rivers’ ecosystems in the areas of land use, forestry management and land acquisition.

Voyageurs National Park Water Resources Management Plan 2005: The focus of this plan is to maintain or improve water quality through management actions, cooperation with adjoining land managers, partnerships, education and outreach programs.

Minnesota Forest Resources Council Northeast Landscape Plan (Section 6C) “ Water Resources and Aquatic Wildlife: Forests are managed in ways that maintain, enhance or restore soil quality, nutrient cycling, water quality and riparian areas. The focus of this section is flooding and channel destabilization, fisheries and invasive species and diseases.

Laurentian Resource Development Council Area Plan 2008-2012

St. Louis County Aquatic Invasive Species Plan: The focus of this plan is to prevent, control and minimize the impacts of AIS within the county and limit their spread elsewhere.

Assessment of Priority Concerns

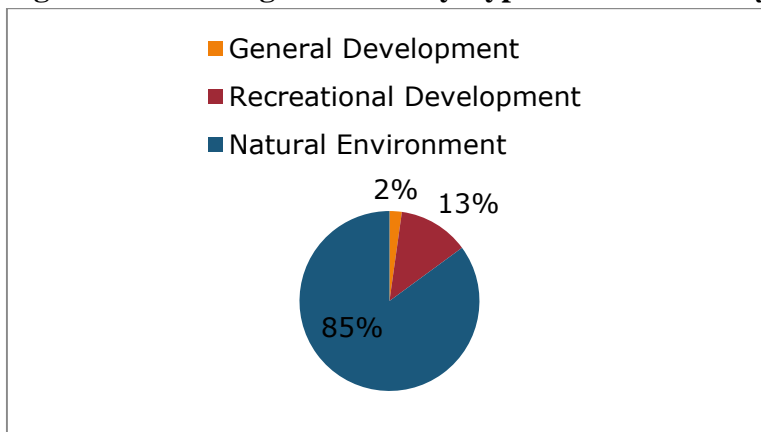
These are general assessments for each priority concern. This list describes each concern in St. Louis County. Each of these priority concerns will be addressed throughout the county.

Priority Concern #1: Development

Goal: Mitigate impacts from development. Emphasis: Sensitive areas, including lakeshore, wetlands, and riparian areas along streams and rivers in the Lake Superior South, St. Louis River, Cloquet River, Little Fork River, Vermilion River and Rainy River Rainy Lake (RRRL) and Rainy River Headwaters (RRHW) Watersheds.

St. Louis County is fortunate to have a large number of high quality lakes. While larger lakes are well known, there is an impressive number of smaller lakes. Figure 1 illustrates the lakes by type as categorized by the state classification system:

Figure 1: Percentage of Lakes by Type St. Louis County



Natural Environment:	923
Recreational Development:	138
General Development:	24
TOTAL:	1085

(St. Louis County Planning and Development)

This classification system is tied to lakes' resilience to human impact. Smaller, shallower natural environment lakes do not resist or rebound from human activity. At the same time, it must be recognized that lakes in one of the other classifications will not be able to rebound from all human impacts; those lakes can absorb only a little more than more sensitive lakes.

Development near lakes, rivers and streams increased during the last decade. While development activity slowed recently, it was still significant. Land use permit data shows a clustering of development near lakes, especially on large, popular lakes or those relatively close to population centers. **Figure 2** shows land use permits by location for 2007-2009.

While overall St. Louis County population projections may differ, shoreland areas will continue to be in high demand for development. Some areas will experience multi-tier development, which will further alter the landscape and cause increased impacts to these sensitive areas. As human use increases within the watershed, the impacts to the water bodies intensify.

Inappropriate or poorly-planned development causes multiple problems that can harm water quality, including loss of riparian area (buffers), erosion that leads to sedimentation, and pollution from leaky or non-conforming septic systems. Inputs of fertilizers, herbicides, pesticides and other chemicals often also increase. Development on natural environment and shallow lakes is

increasing as the shoreland along larger lakes is built up or becomes more expensive. These lakes are less able to withstand impacts and quickly degrade without protective measures. Rivers and streams are subject to the same development pressures.

Shoreland areas play an important role in maintaining water quality. Wetlands and riparian areas are as much part of the lake or stream as is the water itself. When developing sensitive areas, it is important to recognize the impact of design and human behavior. For example, conservation design, with clustered buildings and greater open space, is a useful model. Such design is more conducive to a communal waste disposal system rather than subsurface sewage treatment systems.

Individual property management is also important. Vegetation that is maintained or enhanced creates habitat and absorbs rainfall and melt water. Shoreline vegetation helps prevent erosion and cleans water through natural processes. Limiting impervious surface allows for natural absorption. Avoiding the use of fertilizers and herbicides prevents them from entering the water body.

The St. Louis County Planning and Development Department's Land Use Division enforces the county zoning regulations outside the incorporated limits of municipalities and the following townships: Canosia, Lakewood, Duluth, Midway, Gnesen, Rice Lake and Greenwood. The intent of the county regulations is to balance the protection of natural resources, provide opportunities for economic growth, guard private property owner rights, and encourage the most appropriate use of the land. These regulations, along with appropriate planning, protect water quality and still allow public and private use. All local government units with zoning authority are responsible for enforcing the Minnesota Wetlands Conservation Act. Because wetlands are integral to natural processes, ensuring compliance is an important part of water protection.

Priority Concern #2: Wastewater Management

Goal: Address water quality problems stemming from inadequate wastewater management in the Lake Superior South, St. Louis River, Cloquet River, Little Fork River, Vermilion River and Rainy River Rainy Lake (RRRL) and Rainy River Headwaters (RRHW) Watersheds.

Emphasis: Failing private SSTS and sanitary sewer overflows.

Subsurface Sewage Treatment Systems (SSTS) that do not function correctly impact both ground and surface water quality. In shoreland areas, soil and water conditions may cause systems to be less efficient in treating wastewater. Incomplete treatment can cause public health and water quality problems. Hepatitis, dysentery, and other diseases may be spread by bacteria, viruses, and parasites in improperly treated wastewater. Incomplete treatment can also make near shore water unsafe for swimming. In addition, when household chemicals are not treated correctly, they can end up in the water and make that water toxic to humans, pets, and wildlife. Inadequate treatment can also allow excess nutrients to reach nearby surface waters, resulting in excess algae growth, which can negatively impact recreation and water quality and threaten the survival of fish and other aquatic animals. (*Maintaining Your Shoreland Septic System, University of Minnesota Extension, 2008.*)

The county's urban areas must deal with wastewater management issues on a larger, collective scale. Local municipalities address these issues through their own laws and regulations. There are some substantial problems within the county for which solutions are being implemented. The city of Duluth and the Western Lake Superior Sanitary District are under a Consent Decree with the Environmental Protection Agency (EPA) to reduce the number of sanitary sewage overflows that occur on an annual basis. These events are a result of inflow and infiltration (I&I) of stormwater

runoff into compromised infrastructure systems. Lake Superior, a highly protected and utilized body of water, St. Louis Bay and the St. Louis River are the receiving waters for these overflows. Other cities are also dealing with aging wastewater infrastructure, limited capacity, and failing systems. Several communities on the Iron Range have made proposals to modernize or expand their systems. Six communities were connected to or expanded connections to the Western Lake Superior Sanitary District. The Crane Lake Sanitary District was created, where a treatment facility has been constructed and is in operation. Another facility has been constructed at Aerie Lake in the town of Alborn. A sanitary district is proposed for the Lake Kabetogama and Ash River areas in the northern part of the county. Many others have been proposed, including several in highly developed lake communities. Funding difficulties and local opposition are often the major impediment to solutions.

Subsurface Sewage Treatment Systems

The St. Louis County Environmental Services Department is responsible for managing information and permits for SSTS in the county. There is a loan program available to help residents repair and replace failing or non-conforming systems. The county continues its successful efforts by working to reduce the number of failing septic systems through its SSTS ordinance, which requires that property ownership cannot be transferred unless one of the following conditions is met:

- The seller discloses to the buyer in a sworn affidavit that there is not a subsurface sewage treatment system on the property.
- The property already has a subsurface sewage treatment system with a valid certificate of compliance or notice of non-compliance.
- The seller and the buyer file a Transfer Agreement with the St. Louis County Environmental Services Onsite Wastewater Division Administrator.

The size of the structure, soil types, location of drinking water sources, types of nearby water bodies, topography and geology all determine where private systems shall be located in order to protect local water quality. The county has identified problem areas that have a high number of poorly performing systems resulting from factors such as inadequately-sized lots, poor soils and/or high water tables.

It is important to maintain a properly-functioning septic system in shoreland areas because soil and water conditions in these areas may cause systems to be less efficient in treating wastewater. Incomplete treatment can cause public health and water quality problems. Hepatitis, dysentery, and other diseases may be spread by bacteria, viruses, and parasites in improperly treated wastewater. They can also make near shore water unsafe for swimming. In addition, when chemicals used to clean and conduct other activities around the house are not treated correctly, they can end up in the water and make that water toxic to humans, pets, and wildlife. Inadequate treatment can also allow excess nutrients to reach nearby surface waters, resulting in excess algae growth, which can negatively impact recreation and water quality and threaten the survival of fish and other aquatic animals (*Maintaining Your Shoreland Septic System, University of Minnesota Extension, 2008*).

Problem Areas for Subsurface Sewage Treatment Systems

In the previous water plan, St. Louis County identified areas with wastewater treatment problems. These areas have one or more problems that impede SSTS effectiveness. In some locations, the

density of structures overwhelms the landscape. This is especially true for lake communities as year round use increases. It is estimated there are between 30,000-35,000 subsurface septic systems in the county.

The Western Lake Superior Sanitary District has identified four priority problem areas that need solutions:

Location	Reason
Caribou Lake, Grand Lake Township	High density, failing systems, water table
Grand Lake, Grand Lake Township	High density, high water table, soils, failure
Elde's Corner, Midway Township	Soils, water table
Claymore Street, Duluth	High density, soils, older systems

Figures 5 and 6 illustrate that similar problems exist throughout the county, usually through a combination of causes. In the future, problem areas may change as determined by the county based on local and state requirements. There are several high density lakeshore districts and others with high water tables and poor soils. Lakeshore areas with these problems are a high priority for resolution, through a combination of wastewater treatment and improved stormwater practices. Treating only one dimension of the problem while ignoring the other may not adequately protect the resource.

Priority Concern #3 Ground and Surface Waters

Goal: Protect ground and surface water from the combined impacts of point and non-point source pollution in the Lake Superior South, St. Louis River, Cloquet River, Little Fork River, Vermilion River and Rainy River Rainy Lake (RRRL) and Rainy River Headwaters (RRHW) Watersheds.

Emphasis: Contaminated runoff.

Surface water is one of St. Louis County's greatest assets. An estimated 22.6% of the county is covered by wetlands (bog/marsh/fen) and another 8.7% is covered by lakes, streams and rivers. Duluth alone has 42 named streams, 16 of which are designated trout streams. St. Louis County has 87 "Designated Trout Lake (& Stream) Sections" (*DNR Rules – 6264.0050*). Several lakes are among the most popular for fishing in the Midwest, and Lake Superior is the largest surface freshwater lake in the world by surface area. It is critical to protect these resources in order to maintain the recreation, aesthetic, ecological and economic value they hold for the citizens of St. Louis County.

Both surface and ground water can be contaminated by non-point pollution. Groundwater can become contaminated with nitrogen or atrazine. When impervious surface covers as little as 10-20% of a watershed, it can alter stream morphology and carry everything used or deposited by humans into streams and lakes (Center for Watershed Protection). Mining exposes aquifers, impacts wetlands, increases impervious area and alters the flows of rivers and streams. Industrial uses can contaminate both ground and surface water. The excess runoff from mowed shorelines can carry seven to nine times more phosphorus into surface waters (Radomski and Schultz, 2005). Agricultural practices can pollute ground and surface water with phosphorous, nitrogen, herbicides and insecticides. (*Minnesota Stormwater Manual Issue Paper H Page 6/10/2005 Potential Stormwater Hotspots, Pollution Prevention, Groundwater Concerns and Related Issues.*)

Because nonpoint sources of pollution are the largest threat to water quality, a key objective is to control contaminated runoff. Nonpoint pollution comes from many different sources, including

construction sites, animal feedlots, wildlife, paved surfaces, failing septic systems, and lawns. When taken together, these sources contribute huge quantities of phosphorus, bacteria, sediments, nitrates and other pollutants to the environment. The Minnesota Pollution Control Agency (MPCA) estimates that 86% of the state's water pollution comes from nonpoint sources (*MPCA website*).

Groundwater and Water Supply Regulation

The Minnesota Department of Health (MDH) manages information regarding the county's drinking water and source water systems under its Division of Drinking Water and Source Water Protection. People who acquire their drinking water from a well are individually responsible to assure their well water is safe. The MDH issues permits for and provides guidance on new wells and well-sealing under its Division of Well Management. Unused wells that are not sealed may contaminate groundwater and adjacent wells. If not in regular use, wells are required to be sealed by state statute.

Public Water Supplies

The Environmental Protection Agency (EPA) administers rules relating to the safety of public drinking water systems. The EPA maintains a Safe Drinking Water Information System, which identifies the sources and provides monitoring information for three different types of public drinking water systems:

1. Water systems that serve the same people year-round, such as homes and businesses in cities.
2. Water systems that serve the same people, for only part of the year, such as schools.
3. Water systems that do not consistently serve the same people, such as rest stops and campgrounds.

In St. Louis County, the percentage of these systems served by source type is:

System	Percentage
Groundwater	90
Surface Water	8
Purchased Surface Water	2
TOTAL	100

The Minnesota Department of Natural Resources (DNR) has divided the state into six groundwater provinces according to groundwater availability by source (surficial, buried sands or bedrock). St. Louis County is contained in province number two, limited, moderate and good availability by source, and in province number six, limited availability from all sources.

In addition to supplying water for drinking and other critical uses, groundwater feeds many of our surface waters. Ensuring that the supply of groundwater is not overdrawn or contaminated, or that its flow is not interrupted by human activities, is important to maintain the delicate connection between ground and surface waters and to support the communities that were built around and have come to depend on these resources.

Ground and Surface Water Quality: Specific Issues

Shoreline Areas

Shoreland Best Management Practices can mitigate many of the effects of shoreline development. When maintained or increased, natural vegetation absorbs rain and melt water and eliminates the use of unnecessary chemicals such as fertilizers and herbicides. Minimizing impervious area allows for natural absorption and slows the direct flow to the water body. Rain gardens capture stormwater, preventing it from entering the lake or stream. Septic systems that function properly prevent excess nutrients and contaminants from entering a lake or stream.

Agricultural Practices

While agriculture is not a large percentage of the landscape in St. Louis County, improper agricultural practices can significantly degrade water quality. Certain areas of the county have fairly intensive agricultural use either in tilled fields or pasture. The link between agricultural practices and water quality is well documented. An array of local, state and federal programs are in place to mitigate for agricultural practices and protect water. Vegetative management methods, such as tillage techniques and buffer strips, can limit impacts to water. For example, alternative water sources can be constructed for livestock, to keep them out of waters or limit access. Also, proper use of and avoidance of herbicides, pesticides and fertilizers reduces the potential for contaminating water.

Stormwater and Impervious Surface

Impervious surfaces physically change streams, lakes and wetlands and the runoff from these surfaces carry pollution. They are one of the most significant sources for non-point pollution. All the materials used by humans, including salt, oil, fuel and chemicals such as fertilizers or herbicides are eventually transported into water bodies. This problem exists wherever impervious surface is created, from small areas such as an asphalt driveway for a cabin to large areas such as urbanized areas dominated by asphalt parking lots.

Under both EPA and the MPCA regulation, any government unit operating under the Municipal Separate Storm Sewer Permit System must have a Stormwater Pollution Prevention Plan (SWPPP) that fulfills the following requirements:

1. Public education and outreach
2. Public participation and involvement
3. Illicit discharge detection and elimination
4. Construction site storm water runoff control
5. Post construction storm water management
6. Pollution prevention /good housekeeping

The Regional Stormwater Protection Team (RSPT) and South St. Louis SWCD have been actively involved in helping permitted municipalities meet these requirements. Over the years, they have held multiple educational workshops and events to increase citizen awareness and promote behavioral change. Work in this area is ongoing.

Construction Stormwater

Construction stormwater pollution prevention is regulated under the National Pollution Discharge Elimination System (NPDES) and is enforced by the MPCA. “Any activity associated with road building, landscaping clearing, grading or excavation disturbing more than an acre or as part of larger development or sale” requires a permit. There have been numerous educational opportunities provided, including workshops by the South St. Louis SWCD and others. The problem now appears to be with actual practices, especially by smaller contractors or private citizens.

Groundwater

Leaking Underground Storage Tanks: The MPCA is the lead agency in the permitting and monitoring of existing underground and above-ground storage tanks and in the remediation of contaminated sites.

Wetlands

Wetlands are important to both ground and surface water. Ensuring compliance with the Wetland Conservation Act, particularly avoidance and minimization, provides protection. Local wetland banks are minimal, however. Replacement most often occurs outside the watershed.

Special Concern: Wild Rice

Wild rice is a unique resource in several ways, and as a food source for both humans and wildlife, it is uniquely important. For Native Americans, it is significant both culturally and as a food. A Minnesota DNR inventory found 132 water bodies with 8,939 acres of wild rice within St. Louis County. There are smaller sites that have not been inventoried. Since wild rice often inhabits shallow or sensitive areas, it is vulnerable to many of the disturbances that affect aquatic vegetation. Alterations in water level are particularly destructive. The importance of wild rice should be recognized in any management decision.

Special Concern: Invasive Species

Invasive species, both aquatic and terrestrial, have impacted water quality in St. Louis County. St. Louis Bay now hosts many invasive species, ranging from large fish like the common carp to fish parasites and diseases. Shoreland, wetland and terrestrial plant invaders affect water quality by altering water flows and creating monocultures where there were previously diverse habitats. For example, Rusty Crayfish and spiny water flea affect food webs in lake environments. By altering ecosystem dynamics, invasive species affect productivity and water quality.

Special Concern: Forestry

Areas of timber harvesting particularly where the ratio of open (recently logged) lands to mature forest lands have been determined to be too high (e.g. not to exceed 60/40) for a given watershed. Research has shown that the ratio of 60/40 should not be exceeded within a given watershed, as going beyond this could adversely affect water quantity and quality due to increases in snowmelt runoff. Additional information and research supporting this special concern is available from the *Water Resources Bulletin*; Vol. 19, No. 1; February 1983; Paper No. 82057; Aspen Clearcutting Increases Snowmelt and Storm Flow Peaks in Central Minnesota by Elon S. Verry et. al and in the Proceedings of the Society of American Foresters 2000 convention; November 16-20, 2000; Washington, DC. SAF Publ. 01-02; Land fragmentation and impacts to streams and fish in the central and upper Midwest by Elon S. Verry. The County will encourage the use of the Minnesota

Forest Resources Council voluntary site guidelines to assist private landowners in forest management, forestry plans and re-forestation efforts.

Special Concern: Effects of Mining

Mining activity began in St. Louis County in 1884. Mining today represents 34% of the region's economy, and, with the potential development of non-ferrous mining, \$2.3 billion could be added to the state's economy. Improving upon the environmental legacy will be important for future mining operations to maintain the quality of life for residents and visitors. Although mining is regulated by state and federal agencies, the following should be addressed:

- a. Continuation of mineland reclamation efforts, such as overburden piles and compacted soils.
- b. Monitor water levels in mine pits and take action to mitigate problems, such as water diversions, water intake, and loss of wetlands.
- c. Discharge from tailing basins to waters outside of mining property and its effects on water quality and aquatic life.
- d. Rigorous environmental review prior to permitting new mining operations.

Citizen Education and Behavioral Change

The lesson of non-point pollution is that the most important component for protecting water is everyday behavior. While many people consider themselves to be knowledgeable about environmental issues, there is often a gap between self-perception and what they actually know (*Minnesota Report Card on Environmental Literacy*). An objective is for agencies to foster an increase in citizen awareness and changes in behavior. Citizens can have the largest impact on stormwater quality by acting differently. Different lawn care and gardening practices can eliminate or minimize the use of fertilizers and herbicides; the same can eliminate or minimize the need for watering. Proper disposal of household chemicals, pharmaceuticals, waste oil, paints or solvents prevents them from entering the water supply. Minimizing impervious area and techniques such as rain gardens minimizes surface flow, allowing water to be absorbed rather than flowing to a water body or stormwater system.

Priority Concern #4: Impaired Waters

Goal: Work toward restoring those waters in the county listed as "Impaired" on the state 303(d) list in the Lake Superior South, St. Louis River, Cloquet River, Little Fork River, Vermilion River and Rainy River Rainy Lake (RRRL) and Rainy River Headwaters (RRHW) Watersheds.

Emphasis: Watersheds containing an impaired water as identified by the Minnesota Pollution Control Agency.

Under the Clean Water Act, states are required to assess their waters against standards set for specific uses. The uses are:

List of Designated Use Categories:

- Class 1 – Drinking water
- Class 2 – Aquatic life and recreation
- Class 3 – Industrial use and cooling
- Class 4A- Agricultural use, irrigation
- Class 4B–Agricultural use, livestock and wildlife watering
- Class 5 – Aesthetics and navigation

- Class 6 – Other uses
- Class 7 – Limited resource value waters

All groundwater is Class 1 - drinking water use. Other Class 1 waters include trout streams, Lake Superior, and some mine pit lakes. A majority of all surface waters are Class 2, in accordance with the Clean Water Act's directive that all waters be fishable and swimmable. Essentially all Class 7 waters are reaches that receive treated wastewater from a point source discharge source. All waters not specifically listed (most state waters are not) are automatically designated as Class 2 waters. There are 11 impaired streams and 165 impaired lakes partially or wholly located in St. Louis County according to the state's 303(d) list for 2008. These are just the waterways that have been assessed. Since only about 50% of the state's waters have been formally assessed for water quality, many more waterways in the county may likely be impaired by pollutants. See **Figure 4 for Assessment of Impaired Waters in St. Louis County**. That means that many more waterways in the county are likely impaired by various pollutants. The two largest watersheds, Rainy River Headwaters and St. Louis Rivers, were intensively assessed between 2008 and 2011. Further study will attempt to narrow down the specific locations and causes for the impairments.

Smaller watersheds and area lakes will be or are under proposal to be intensively assessed in the near future by the SWCD's, and other local groups, including Hibbing Community College and lake associations. It should be emphasized that this process is in its beginning stages. According to the MPCA, past monitoring suggests that if all water bodies in the state were assessed, about 40% of them would likely be impaired for one or more pollutants.

All of the St. Louis County lakes on the state 303(d) list are listed due to pollution caused by mercury deposition (Hg) except for Manganika Lake (southwest of Virginia), a Class 2B lake that is impaired for nutrients and eutrophication. The restoration of waters impaired by mercury will be handled under a "blanket" Statewide Mercury TMDL Pollutant Reduction Plan. The TMDL restoration process for other waters will be handled locally.

Mississippi River Basin

This includes only two small parts of the county. One is an area generally southwest of Hibbing running along the border with Itasca County. This area is highly affected by the Keewatin taconite tailings pit and other mining effects. The other is in the extreme southwest of the county with Prairie Lake and Prairie River as the two significant water bodies. Prairie Lake is listed as impaired for mercury.

Rainy River Basin

Within the county, there are four watersheds as part of this basin. The Littlefork River watershed was intensively assessed by the MPCA in 2008 & 2009. Much of the main branch was already designated as impaired for mercury and turbidity. The main reach from the headwaters to the Rice River is proposed to be listed for turbidity. More precise data will be available when specific reaches are re-assessed. The Sturgeon River was already listed for mercury. Many of the lakes are also listed for mercury. The Rainy River-Rainy Lake Watershed in the far northwest has no stream reaches currently or proposed to be listed. Many lakes, however, are listed for mercury. The Vermilion River watershed is in the far north central part of the county. The river itself is under proposed listing for mercury as many lakes already are.

Lake Superior Basin

This basin has **three distinct watersheds** within the county:

The **Lake Superior South watershed** includes streams that flow directly into Lake Superior along the North Shore in the southeast area of the county. This area is characterized by relatively high rates of descent, flashy streams, troublesome soils and significant land use changes. All of the streams are listed as impaired for turbidity and several are listed for other for other reasons. The South St. Louis SWCD completed a three year TMDL study on the Knife River which is in approval process with the state and the EPA. The Miller Creek TMDL monitoring is finished and the report will be completed in early 2010. A study for the French, Sucker and Talmadge rivers is proposed but has not yet been funded.

The **Cloquet River watershed** runs in a northeast-southwest direction in the southeast quarter of the county. This is a highly forested landscape, and the main branch of the Cloquet River itself remains relatively healthy, its only listing being for mercury outside of St. Louis County. At the southwest end of the watershed are several large reservoirs; Island, Fish and Boulder lakes. Because of their relatively large size and proximity to Duluth, these are popular for recreation, cabins and year round homes. The area has undergone fairly significant development and many areas approximate a suburban character. While no streams other than the Cloquet River itself are currently listed, many lakes and the reservoirs are listed for mercury.

The **St. Louis River watershed** is the dominant feature of the county. The entire river is listed as impaired for mercury; from Cloquet downstream is an area of historical industrial impacts with significant water quality issues. The river and estuary are listed for the following impairments: polychlorinated biphenyls (PCBs); mercury, dieldrin; dichlorodiphenyltrichloroethane (DDT); and other persistent bio-accumulative toxics. The entire estuary is listed as an EPA Great Lakes Area of Concern. It is also the receptacle, and now source, for numerous invasive species. In contrast, the rest of the watershed appears relatively healthy. Many lakes are listed for mercury. However, considering the size of the watershed, little assessment has actually been done at the sub-watershed level, especially at the north end of the watershed. The headwaters along the south side of the Laurentian divide have been heavily impacted by mining, and despite this history, there is little data available.

Both in geography and intensity, significant gaps remain in water quality data throughout the county. There has been a historical assumption that aside from some specific locations, such as St. Louis Bay, water quality is generally good. However, as monitoring has been accomplished, more problems, both current and historical, are found. The Impairment-TMDL process is science based, takes time and in most cases is just beginning. Considerable work will be required to move through the stages of watershed restoration.

Implementation Schedule

<u>Priority Concern #1: Development</u>					
Goal #1: Mitigate impacts from development. <u>Emphasis</u> : lakeshore, wetlands, and riparian areas along streams and rivers.					
Action	Lead Agency	Partners	Watersheds (Table 1)	Timeline	Estimated Cost
1. Implement stormwater management retrofit projects by specific watershed or lakeshed.	SWCD, BWSR	BWSR	LSS, Cloquet R, SLR, LFR, VR, RRRL, RRHW	2015-2020	Project Dependent
2. Encourage implementation of innovative stormwater management practices.	St. Louis County, LGU's	SWCD; DNR; BWSR	LSS, Cloquet R, SLR, LFR, VR, RRRL, RRHW	2015-2020	Project Dependent
3. Provide technical and financial assistance for BMP installation for stormwater management.	SWCD	LGU; MPCA	LSS, Cloquet R, SLR, LFR, VR, RRRL, RRHW	2015-2020	\$100,000/yr
4. Provide the most current information about BMP's to correct/prevent erosion using native species	All local government units with zoning authority,	SWCD's, DNR, BWSR	LSS, Cloquet R, SLR, LFR, VR, RRRL, RRHW	2015-2020	Project Dependent
5. Develop and/or distribute educational media on the importance of BMP implementation and proper land use development.	St. Louis County, LGU's	DNR, BWSR, SWCD's	County Wide	2015-2020	\$50,000

Goal #2: Develop policies and guidelines that address existing and future development.

Action	Lead Agency	Partners	Watersheds	Timeline	Estimated Cost
1. Broaden and strengthen county ordinances to include stormwater and erosion control requirements. Support strengthening similar ordinances in other local government units.	St. Louis County	LGU's with Zoning Authority	County Wide	2015-2020	\$20,000
2. Develop policies requiring mitigation measures for all variance requests in shoreland areas.	St. Louis County	LGU's with zoning authority	LSS, Cloquet R, SLR, LFR, VR, RRRL, RRHW	2015-2020	\$2,000
3. Develop policies that effectively plan for future development and growth such as updating the county comprehensive plan and support LGU's to do the same.	St. Louis County	LGU's with zoning Authority	County wide	2015-2020	\$50,000
4. Develop policies and ordinance language for the protection of natural environment lakes, such as lot size, stormwater and erosion control standards, and/or conservation design developments.	St. Louis County	LGU's with zoning Authority	County wide	2015-2020	\$25,000

Priority Concern#2: Wastewater Management

Goal #1: Address water quality treatment problems stemming from inadequate wastewater management.

Emphasis: Failing SSTS and sanitary sewer overflows.

Action	Lead Agency	Partners	Watersheds	Timeline	Estimated Cost
1. Continue to enforce the county-wide point of sale program for SSTS.	St. Louis County	MDH	LSS, Cloquet R, SLR, LFR, VR, RRRL, RRHW	2015-2020	\$45,000/yr
2. Identify and bring failing systems into compliance	St. Louis County	MDH	LSS, Cloquet R, SLR, LFR, VR, RRRL, RRHW	2015-2020	\$20,000/yr
3. Increase the amount of data available to the county and public.	St. Louis County	MDH	County Wide	2015-2020	\$10,000/yr
4. Continue to provide financial assistance in the form of low interest loans to approximately 7 homeowners per year needing to upgrade or replace failing or non-conforming septic systems. (Ordinance # 49).	St. Louis County	MPCA	LSS, Cloquet R, SLR, LFR, VR, RRRL, RRHW	2015-2020	\$125,000/yr
5. Continue to provide financial assistance for low income households for the repair or replacement of up to 10 septic systems per year identified as imminent threats to public health.	St. Louis County	MPCA, BWSR, St. Louis County HRA	LSS, Cloquet R, SLR, LFR, VR, RRRL, RRHW	2015-2020	\$150,000/yr
6. Support wastewater treatment facility projects in areas identified on the SSTS Problems Areas Map.	St. Louis County	MDH	LSS, Cloquet R, SLR, LFR, VR, RRRL, RRHW	2015-2020	\$20,000/yr
7. Support the efforts of the city of Duluth and other municipalities or communities to eliminate or reduce sanitary system overflows and repairing,	MPCA	BWSR; LGU; SWCD;	LSS, SLR	2015-2020	\$10,000/yr

upgrading, modernizing wastewater treatment systems.					
8. Develop a septic system permit and tracking component to the land records portal to identify problem areas based on failure rate, soil and water conditions.	St. Louis County	N/A	County Wide	2015-2020	\$300,000
9. Develop septic system database using GIS, expansion areas, wells and suitable building area on all parcels.	St. Louis County	N/A	County Wide	2015-2020	\$500,000
10. Provide education on the technology, use and maintenance of private sewage treatment systems to home and cabin owners.	St. Louis County	LGU's	LSS, Cloquet R, SLR, LFR, VR, RRRL, RRHW	2015-2020	\$1,000/yr

Priority Concern #3: Ground and Surface Water

Goal #1: Protect ground and surface water from the combined impacts of point and non-point source pollution.

Emphasis: Contaminated runoff.

Action	Lead Agency	Partner	Watersheds	Timeline	Estimated Cost
1. Implement the St. Louis County Aquatic Invasive Species Prevention Aid Program	St. Louis County	MN Sea Grant, SWCD, Lake Assoc.	LSS, Cloquet R, SLR, LFR, VR, RRRL, RRHW	2015-2020	\$600,000/yr
2. Acquire data through technology development, GIS analysis, remote sensing and ground truthing, surveys or purchase to fill pre-existing or discovered data gaps as needed.	St. Louis County	N/A	County Wide	2015-2020	\$1,300,000
3. Encourage and assist landowners to install water protection practices and BMP's.	SWCD	BWSR; MPCA	LSS, Cloquet R, SLR, LFR, VR, RRRL, RRHW	2015-2020	\$75,000

4. Encourage and assist LGU's, communities and non-governmental organizations to prepare watershed management plans.	SWCD	BWSR	LSS, Cloquet R, SLR, LFR, VR, RRRL, RRHW	2015-2020	Unknown
5. Encourage and assist in wetland avoidance and impact minimization.	St. Louis County; LGU's	SWCD; County; LGU; BWSR	LSS, Cloquet R, SLR, LFR, VR, RRRL, RRHW	2015-2020	\$200,000/yr
6. Protect waters containing wild rice and avoid impacts to wild rice.	DNR	SWCD, BWSR, MDA, DOT, NGO	County Wide	2015-2020	Unknown
7. Provide Cost-Share Assistance for sealing unused wells	SWCD; BWSR	MDH	County Wide	2015-2020	\$20,000
8. Support those communities in current wellhead protection areas in developing and implementing their plans and strategies. Consider wellhead protection plans when making land use decisions.	MDH	LGU's; SWCD; MPCA	LSS, Cloquet R, SLR, LFR, VR, RRRL, RRHW	2015-2020	Unknown
9. Encourage and assist private landowners in forest management, forestry plans and re-forestation. Encourage and assist in operation by the Minnesota Forest Resource Council voluntary site guidelines.	DNR	SWCD; BWSR	LSS, Cloquet R, SLR, LFR, VR, RRRL, RRHW	2015-2020	\$40,000
11. Support, develop and continue efforts to prevent, control or extirpate invasive species and weeds.	DNR	SWCD, BWSR, MDA, DOT, NGO	County Wide	2015-2020	\$50,000

Goal #2: Monitor, assess and restore watersheds.					
Action	Lead Agency	Partners	Watersheds	Timeline	Estimated Cost
1. Perform or assist other agencies, governments and organizations with monitoring and assessment of public waters.	SWCD, MPCA	MPCA; NGO; Sea Grant	LSS, Cloquet R, SLR, LFR, VR, RRRL, RRHW	2015-2020	\$700,000
2. Continue monitoring wildlife impacts such as beaver and geese	DNR	NGO; DNR; BWSR	County Wide	2010-20120	Unknown
Goal #3: Coordinate and perform education activities					
Action	Lead Agency	Partners	Watersheds	Timeline	
1. Coordinate lake and stream citizen monitoring program.	MPCA	DNR; SWCD; BWSR	LSS, Cloquet R, SLR, LFR, VR, RRRL, RRHW	2015-2020	Unknown
2. Educate the public on the importance of sealing unused wells to protect groundwater quality.	MDH	St. Louis County	County Wide	2015-2020	Unknown
3. Facilitate educational programs on stressors and impairments related to water quality BMP's for citizens and property owners.	SWCD	MPCA, DNR, LGU's, ST. LOUIS COUNTY	County Wide	2015-2020	\$5,000
4. Assist and or encourage the development or activity of lake associations.	MPCA	LGU's, SWCD	LSS, Cloquet R, SLR, LFR, VR, RR RRRL, RRHW	2015-2020	Unknown

5. Provide citizens information on the importance of recycling and proper disposal of household hazardous waste, pharmaceutical's, electronic waste and petroleum products.	MPCA	St. Louis County WLSSD	LSS, Cloquet R, SLR, LFR, VR, RRRL, RRHW	2015-2020	\$24,000/yr
<u>Priority Concern #4: Impaired Waters</u> <u>Goal #1:</u> Work towards restoring those waters in the county listed as impaired on the State 303(d) list.					
Action	Lead Agency	Partners	Watersheds	Timeline	Estimated Cost
1. Seek funding for and complete total maximum daily load studies.	SWCDs, U of M, DNR.	U of M, DNR.	LSS, Cloquet R, SLR, LFR, VR, RRRL, RRHW	2015-2020	Size Dependent
2. Monitor and assess data determining if water resources meet water quality standards for designated uses.	MPCA, SWCDs, BWSR, DNR, U of M; NGO	SWCDs, BWSR, DNR, U of M; NGO	LSS, Cloquet R, SLR, LFR, VR, RRRL, RRHW	2015-2020	Size Dependent
3. Develop implementation and/or protection strategies based on watershed assessments.	MPCA	SWCD, BWSR, DNR U of M; ST, LOUIS COUNTY	LSS, Cloquet R, SLR, LFR, VR, RRRL, RRHW	2015-2020	Size Dependent
4. Implement projects and actions directed at reducing sources of non-point pollution.	SWCD	MPCA; U of M; NGO; LGU	LSS, Cloquet R, SLR, LFR, VR, RRRL, RRHW	2015-2020	Size Dependent

5. Support and complete projects that address the beneficial use impairments of the St. Louis River area of concern.	MPCA	SWCD; LGU:SLRA	LSS, Cloquet R, SLR, LFR, VR, RRRL, RRHW	2015-2020	Size Dependent
6. Complete TMDL plans.	MPCA	SWCD; BWSR	LSS, Cloquet R, SLR, LFR, VR, RR RRRL, RRHW	2015-2020	Size Dependent

Supporting Plan or Program List

Local:

St. Louis County:	Ordinance # 46 (Zoning), Ordinance #27 (Comprehensive Plan) Ordinance #33 (Subdivision Regulations), Ordinance #43 (Floodplain Management) Ordinance #55(SSTS), Septic Loan program
St. Louis County Land Department:	Sustainable Forestry Initiative; ISO 14001 Environmental Management System.
City of Hibbing:	Stormwater Management
South St. Louis SWCD:	Stormwater Demonstration Projects; Small Acreage Forestry Assistance; Miller Creek TMDL, Knife River TMDL; Amity Creek Slump Stabilization; Contractor Stormwater Education Workshops; Minnesota WCA; State Cost Share Assistance. Regional Stormwater Protection Team; Coastal Non-Point Program; Education
North St. Louis SWCD:	East Swan River Watershed Assessment; Forestry Technical Assistance; Minnesota WCA, State Cost Share Assistance; Coastal Non-Point Program; Clean Water Legacy Forestry; Education

Cities with Zoning Authority:

Aurora	Hibbing
Babbitt	Hoyt Lakes
Biwabik	Iron Junction
Brookston	Kinney
Buhl	Leonidas
Chisholm	McKinley
Cook	Meadowlands
Duluth	Mountain Iron
Ely	Orr
Eveleth	Proctor
Floodwood	Tower
Gilbert	Virginia
Hermantown	Winton

Townships with Zoning Authority:

Canosia
Duluth
Gnesen
Greenwood
Lakewood
Midway
Rice Lake

Glossary

AOC:	Area of Concern
BMP:	Best Management Practice
BWSR:	Board of Water and Soil Resources
DNR:	Department of Natural Resources
DOT:	Department of Transportation
EPA:	Environmental Protection Agency
GIS:	Geographic Information System
ISTS:	Individual Sewage Treatment System
LGU:	Local Government Unit
MDA:	Minnesota Department of Agriculture
MDH:	Minnesota Department of Health
MPCA:	Minnesota Pollution Control Agency
NGO:	Non-governmental Organization
NPS:	Non-point Source Pollution
POS:	Point of Sale
SWCD:	Soil and Water Conservation District
TMDL:	Total Maximum Daily Load
USFS:	United States Forest Service
SLRA:	St. Louis River Alliance
WRAPS	Watershed Restoration and Protection Strategies
GLRI	Great Lakes Restoration Initiative

Bibliography

Bibliography

- (LCCMR), LEGISLATIVE-CITIZEN COMMISSION ON MINNESOTA RESOURCES. *Minnesota Statewide Conservation and Preservation Plan*. Planning Document, St. Paul, MN: State of Minnesota, November 2008.
- Agency, Environmental Protection.
- Agency, Minnesota Pollution Control. *Lake Superior Basin Plan*. Planning Document, Duluth: Minnesota Pollution Control Agency, 2004.
- Agency, Minnesota Pollution Control. *Minnesota Nonpoint Source Management Program Plan (NSMPP)*. Planning Document, St. Paul: Minnesota Pollution Control Agency, 2008.
- Agency, Minnesota Pollution Control. *Minnesota Stormwater Manual*. St. Paul: Minnesota Pollution Control Agency, 2005.
- Agency, Minnesota Pollution Control. *NPDES Permit 0042579*. St. Paul: Minnesota Pollution Control Agency, 2005.
- Agency, Minnesota Pollution Control. *Rainy River Basin Plan*. Planning Document, International Falls: Minnesota Pollution Control Agency, 2004.
- Council, Laurentian RC&D. *Laurentian Resource Conservation & Development Council Area Plan 2008-2012*. Planning Document, Hermantown: Laurentian RC&D Council, 2008.
- Development, St. Louis County Planning and. Duluth, MN: St. Louis County Planning and Development.
- Development, St. Louis County Planning and. *St. Louis County Water Management Plan*. Planning Document, Duluth: St. Louis County, 2001.
- Health, Minnesota Department of. "Minnesota Department of Health." St. Paul.
- Minnesota, State of. *Wetland Conservation Act Rules Chapter 8420*. St. Paul: Minnesota Board of Water and Soil Resources, 2009.
- Park, Voyageurs National. *Voyageurs National Park Water Resources Management Plan*. Planning Document, National Park Service, 2005.
- Protection, Center for Watershed. *Impacts of Impervious Cover on Aquatic Systems*. Presentation, Ellicott City, MD : Center for Watershed Protection, 2003.
- Protection, Center for Watershed. *Why Watersheds? An Introduction to the Whys and Hows of Water Resource Protection*. Presentation, Elliot City, MD: Center for Watershed Protection, 1999.
- Resources, Minnesota Department of Natural. *Natural Wild Rice In Minnesota*. Legislative Report, St. Paul: Minnesota Department of Natural Resources, 2008.
- Schultz, Radomski and. "The Alternative Shoreland Management Standards."
http://www.dnr.state.mn.us/waters/watermgmt_section/shoreland/shoreland_rules_update.html.
September 2005.
- http://files.dnr.state.mn.us/waters/watermgmt_section/shoreland/Yourlake9.pdf (accessed January 2010).
- Service, Minnesota Extension. *Maintaining Your Shoreland Septic System*. St. Paul: University of Minnesota, 2002.
- Service, United States Forest. *Superior National Forest Land and Resource Management Plan*. Planning Document, Duluth: United States Forest Service, 2004.
- Services, St. Louis County Environmental. Duluth.
- SWCD, Crow Wing. *2008 Crow Wing County Comprehensive Local Water Plan*. Planning Document, Baxter, MN : Crow Wing SWCD, 2008.
- Wilson, Steven Heiskary and Bruce. "Minnesota's approach to lake nutrient criteria development." *Lake Reservoir Management*, 2008: 24:282-297.

Figures

Figure 2

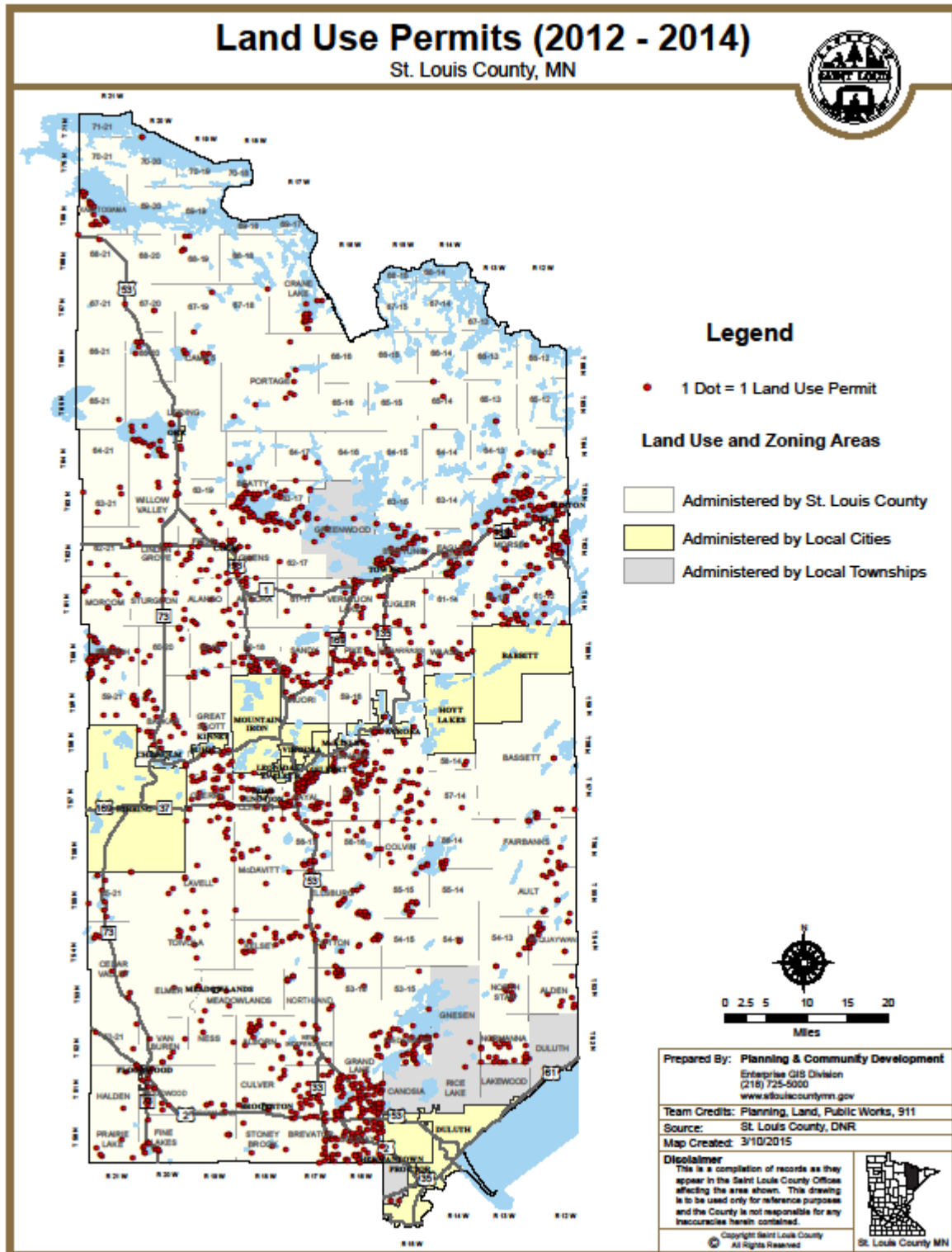


Figure 3

Intensive Watershed Monitoring

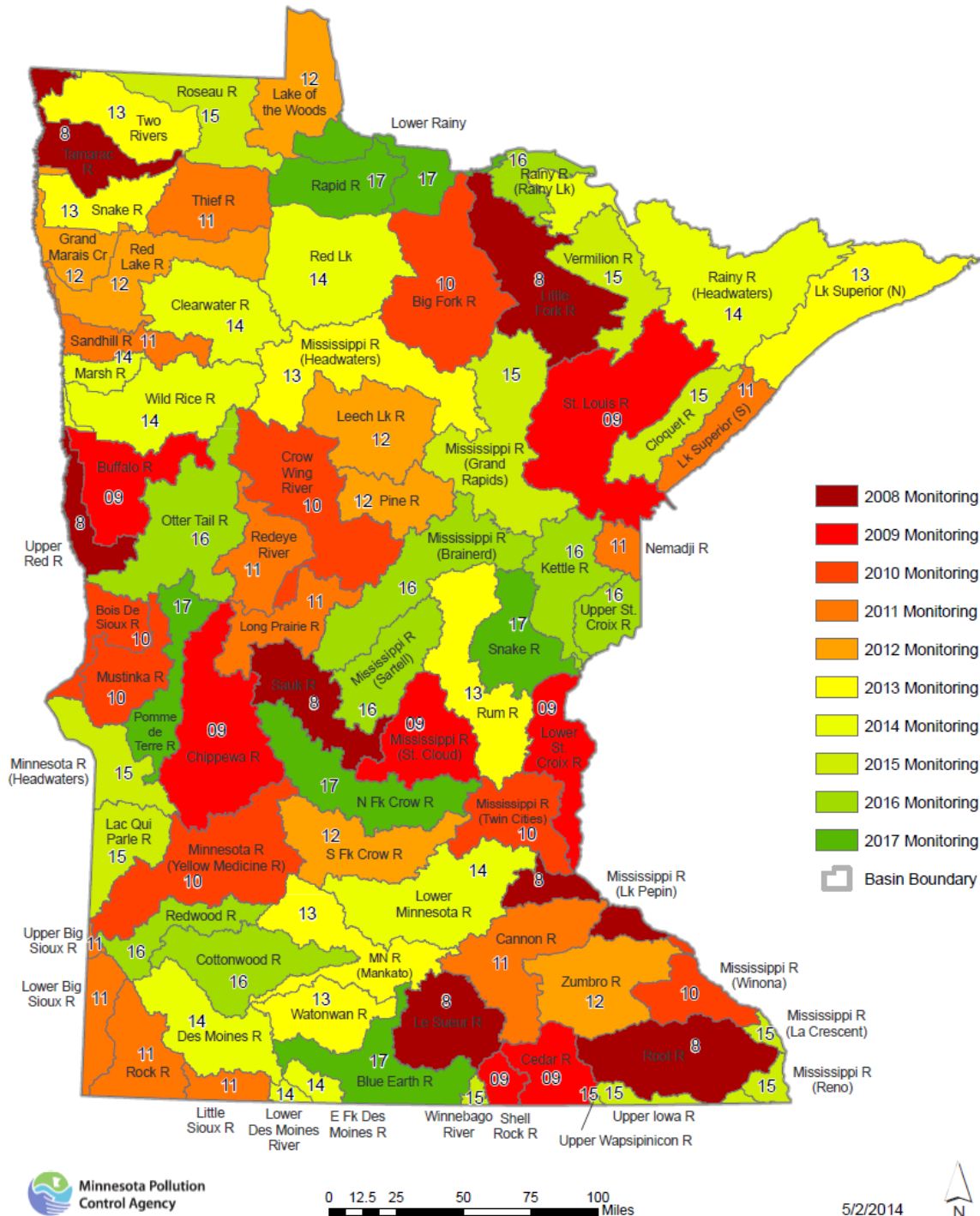


Figure 4

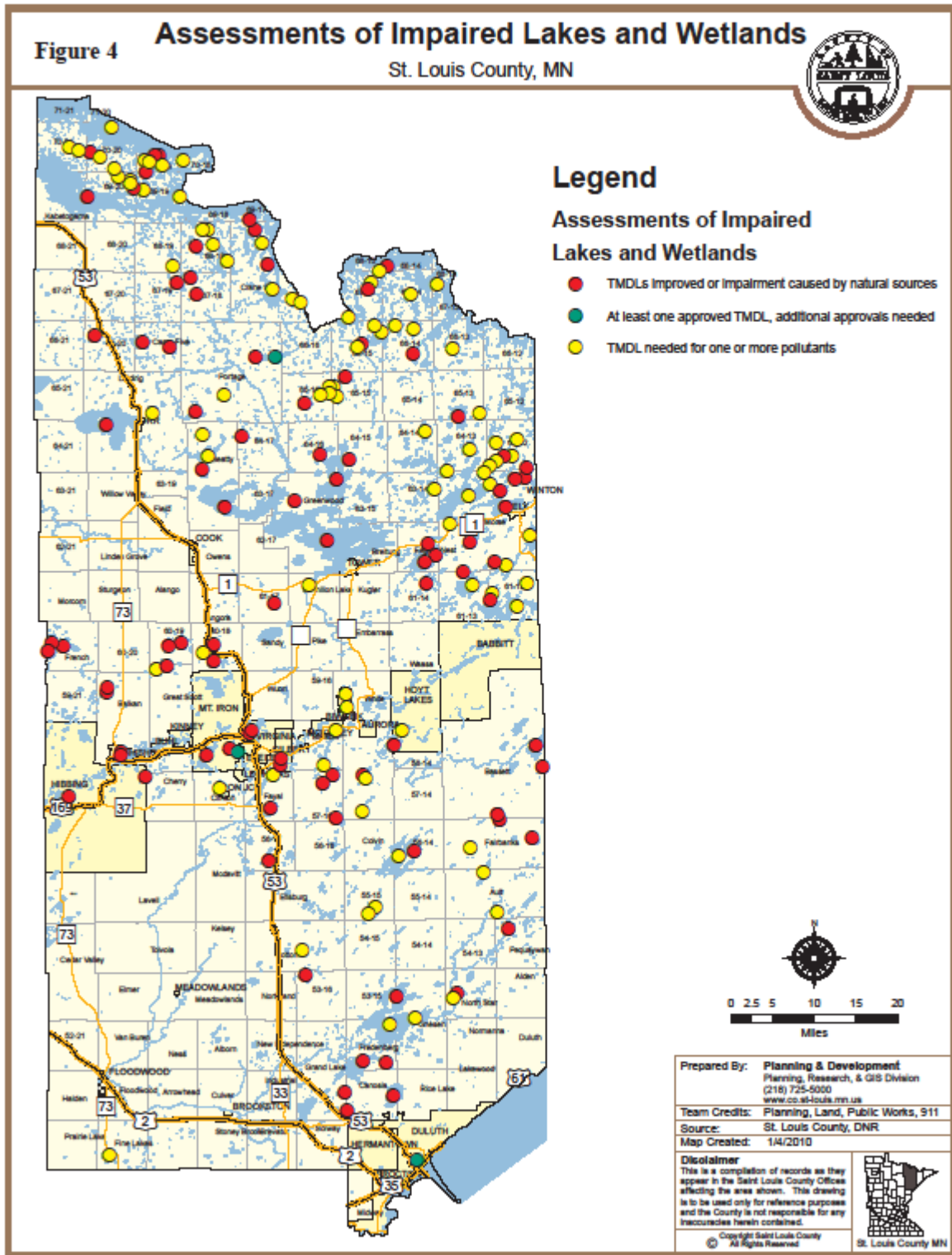


Figure 5

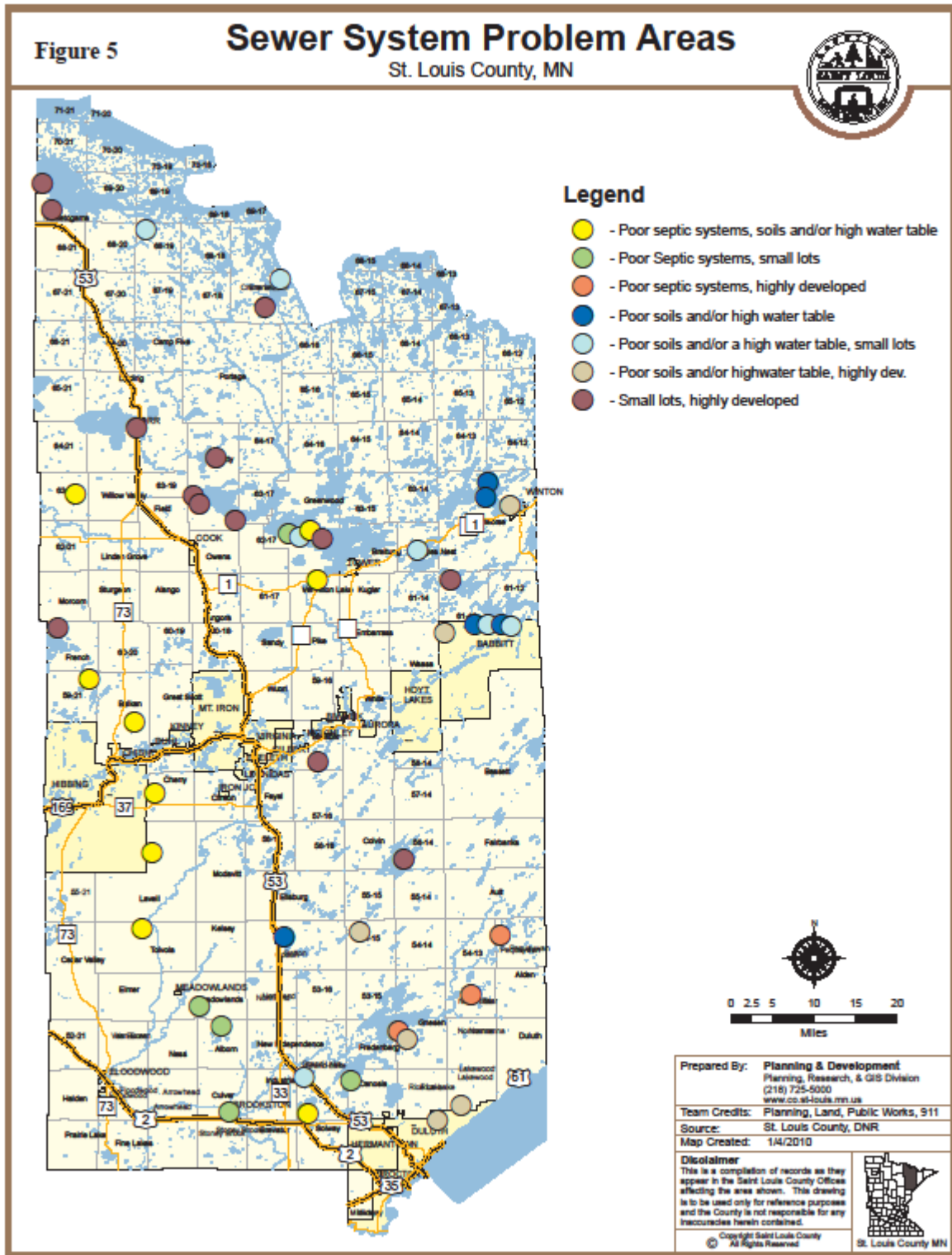


Figure 6. List of ISTS Problem Areas

These areas are defined due to a single or combination of factors identified on the Sewer System problem area map. The areas are listed by general location only.

Greany-Willow Valley	Isle of Pines
St. Odilia Beach Rd	Dewey Lake Area
Balkan Great Scott	Quade Lake Area
Little Swan Lavell Area	Toivola Area
Grand Lake	Thomas Road, Breezy Point & Sundling RD
Meadowlands	Maple Leaf Lake East Side Area
Brookston	Caribou Lake
Pequayam Lake	Barr and Briar Lake
Island Lake Drive	Passi Rd
Burntside Ridge RD	West Babbit
Timber Bay Rd	Cotton and Kauppi Lake Area
Ash River Trail-Namakan Basin	Remote Access Area-Crane Lake
Vermillion Grove & Breezy Point	Eagles Nest
Finn Bay	East Babbit
Beaver Lake	Grant McMahan Rd
Benville	Long Lake
Schultz and Horseshoe Lake	Moose Horn Point
Tomahawk & Red Pine Resort	Crane Lake
Oak Point	Elbow Lake Manor
Vos Rd	Wakemup
Soderholm Beach	Birch Point
Bear Island Lake	Esquagama Lake
Whiteface reservoir	Little Sturgeon-Side Lake Area

Figure 7

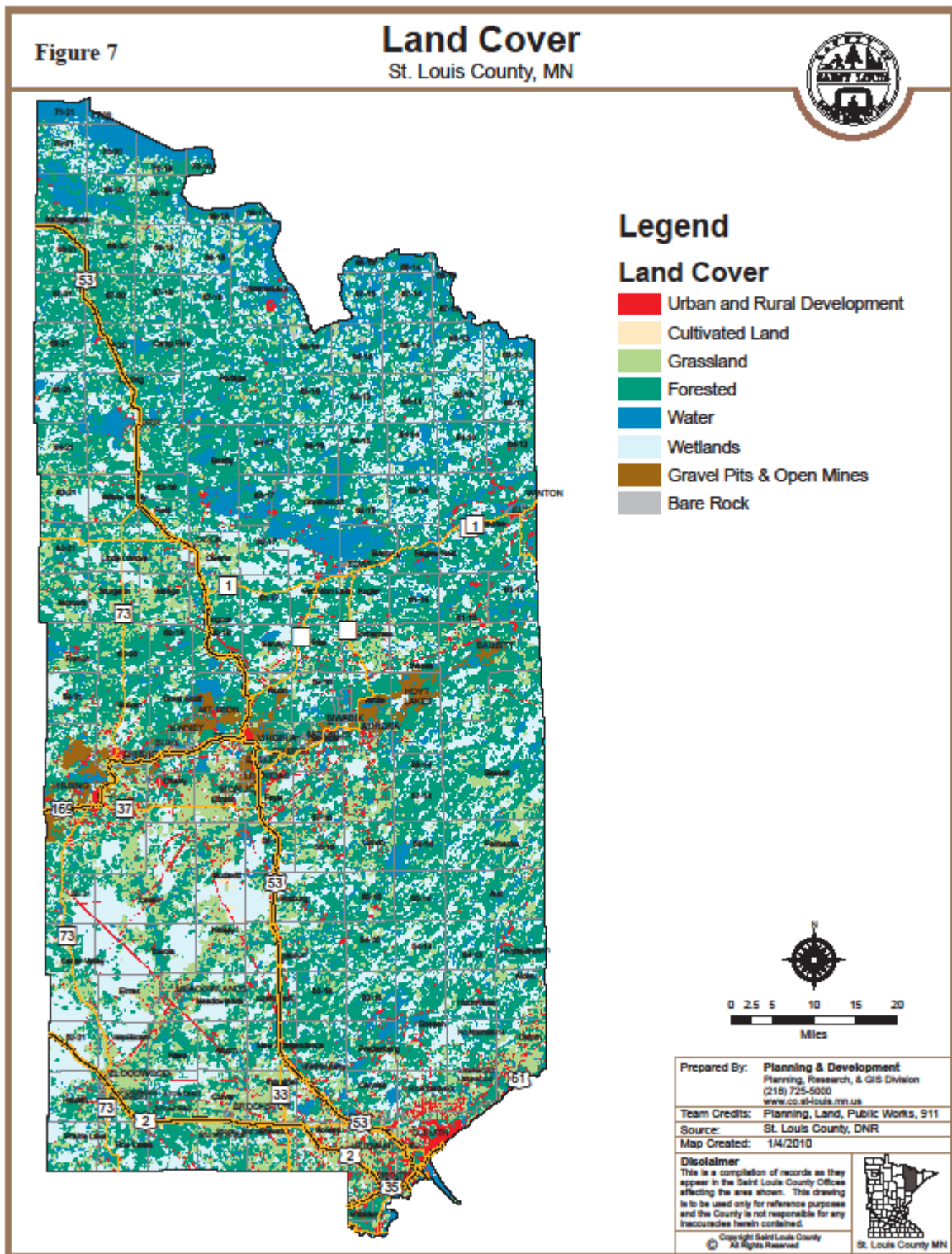


Table 1

BASINS, MAJOR WATERSHEDS AND HYDROLOGIC UNIT CODES

BASIN NAME	MAJOR WATERSHED UNIT	HYDROLOGIC UNIT CODE (HUC)
Lake Superior	Lake Superior South (LSS)	04010101
Lake Superior	Cloquet River	04010202
Lake Superior	St. Louis River (SLR)	04010201
Little Fork River	Little Fork River (LFR)	09030005
Vermilion River	Vermilion River(VR)	09030002
Rainy River Rainy Lake	Rainy Lake (RRRL)	09030003
Rainy River Headwaters	Rainy River(RRHW)	09030001
Mississippi River	Mississippi River (MR)	07010103